Math Makes Sense Page 76-78

4. Write each product as a single power.

a) $5^5 \times 5^4$ b) $10^2 \times 10^{11}$

c) $(-3)^3 \times (-3)^3$ d) $21^6 \times 21^4$

e) $(-4)^1 \times (-4)^3$ f) $6^{12} \times 6^3$

g) $2^0 \times 2^4$ h) $(-7)^3 \times (-7)^0$

5. Write each quotient as a power.

a) $4^5 \div 4^3$ b) $8^9 \div 8^6$

c) $15^{10} \div 15^0$ d) $(-6)^8 \div (-6)^3$

e) $\frac{2^{12}}{2^{10}}$ f) $\frac{(-10)^{12}}{(-10)^6}$

g) $\frac{6^5}{6^1}$ h) $\frac{(-1)^5}{(-1)^4}$

10. Simplify, then evaluate.

a) $10^2 \times 10^2 + 10^4$ b) $10^3 \times 10^3 - 10^3$

c) $10^{11} - 10^3 \times 10^6$ d) $10^1 + 10^5 \times 10^2$

e) $10^6 \div 10^2 \times 10^2$ f) $10^9 \div 10^9$

g) $\frac{10^{12}}{10^6}$ h) $\frac{10^4 \times 10^3}{10^2}$

i) $\frac{10^{11}}{10^4 \times 10^2}$ j) $\frac{10^5}{10^3} + 10^2$

12. Assessment Focus An alfalfa field is a rectangle 10^4 m long and 10^3 m wide.

a) Write an expression for the area of the field, then evaluate the expression.

b) Write an expression for the perimeter of the field, then evaluate the expression.

c) i) Use the area in part a. Find all possible dimensions for a rectangular field with side lengths that are powers of 10.

ii) Find the perimeter of each field in part i.

d) Explain why the exponent laws are helpful for solving area problems, but not for perimeter problems.

13. Evaluate.

a) $2^3 \times 2^2 - 2^5 \times 2$

b) $3^2 \times 3 + 2^2 \times 2^4$

c) $4^2 - 3^0 \times 3 + 2^3$

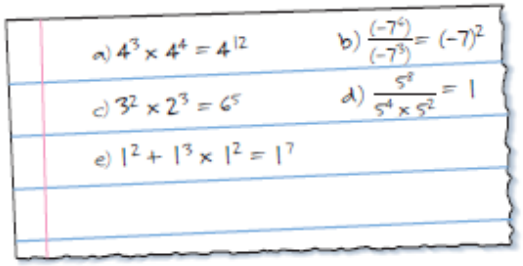
d) $(-3)^6 \div (-3)^5 - (-3)^5 \div (-3)^3$

e) $(-2)^4[(-2)^5 \div (-2)^3] + (-2)^4$

f) $-2^4(2^6 \div 2^2) - 2^4$

g) $(-5)^3 \div (-5)^2 \times (-5)^0 + (-5)^2 \div (-5)$

15. Identify, then correct any errors in the student work below. Explain how you think the errors occurred.



17. a) Evaluate.

i) $5^2 + 5^3$ ii) $5^2 \times 5^3$

b) In part a, explain why you could use an exponent law to simplify one expression, but not the other.

18. a) Evaluate.

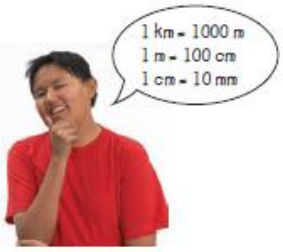
i) $4^3 - 4^2$ ii) $4^3 \div 4^2$

b) In part a, explain why you could use an exponent law to simplify one expression, but not the other.

20. Find two powers that have a product of 64. How many different pairs of powers can you find?

21. Write a product or quotient, then use the exponent laws to find the number of:

a) centimetres in 1 km
b) millimetres in 1 km
c) kilometres in 10^5 m
d) metres in 10^9 mm



22. Write a product or quotient, then use the exponent laws to find the number of:

a) square metres in 10^2 km^2
b) square metres in 10^6 cm^2
c) square millimetres in 10^6 cm^2
d) square centimetres in 1 km^2